The Spectrum of Magnesium Hydride.

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(Abstract.)

The author has previously discovered that many of the band lines peculiar to the sun-spot spectrum are identical with lines composing the green fluting attributed to magnesium hydride by Liveing and Dewar. The present paper gives the results of a further investigation of this spectrum with high dispersion, together with details of wave-length determinations.

The principal results may be briefly summarised as follows:—(1) No sufficient reason has been found for modifying Liveing and Dewar's conclusion that the spectrum is produced by the combination of magnesium with hydrogen. (2) Lines are shown at short intervals in all parts of the spectrum from the extreme red to λ 2300, and definite groups of flutings begin at 5621·57, 5211·11, 4844·92, 4371·2, and near 2430. (3) From photographs of the magnesium arc in hydrogen at low pressures, taken with a 10-foot concave grating, the positions of close upon 2000 lines composing the three principal bands have been determined. The wave-lengths were derived from the interference standards of Fabry and Buisson, but have been corrected to Rowland's scale to facilitate comparison with solar spectra. (4) Twelve of the series of lines which compose the green band have been traced, and it is shown that none of the formulæ which have been proposed are sufficiently general in their application to represent all of these series within the limits of error of measurement. For the longer series the closest approximation is given by Halm's equation. (5) The identification of magnesium hydride in the sun-spot spectrum has been fully confirmed, and is clearly demonstrated by photographs submitted for reproduction. (6) It is shown that many of the bright interruptions of the dark background of the spot spectrum are not bright lines, but merely clear interspaces between lines or groups of lines in the spectrum of magnesium hydride. (7) The presence of the magnesium hydride flutings, together with flutings of titanium oxide and calcium hydride discovered at Mount Wilson, accords with the view that spots are regions of reduced temperature, and that their darkness is at least partly due to absorption. (8) The investigation of the possible presence of lines of magnesium hydride in the ordinary solar spectrum is for several reasons inconclusive, but there is evidence that very few, if any, of the thousands of faint lines tabulated by Rowland are to be accounted for by this substance.